

### **REMARKS**

In the Office Action mailed May 3, 2005 (hereinafter, the "Office Action"), Claims 1 and 4-21 were pending for consideration with claims 2-3 and 22-30 being withdrawn from consideration. Of these, Claims 1 and 4-21 were rejected as allegedly either anticipated or obvious under 35 U.S.C. §§ 102(e) and 103(a), respectively. Each of these rejections is addressed in turn below.

By the present amendment, Claims 16-19 have been canceled. Claim 1 has been amended to include a specific list of interstitial materials. Support for this amendment can be found at page 14, lines 18-19 and originally filed claim 20. Claims 20 and 21 have been amended to correct their dependency in view of the cancellation of Claim 16. No new matter is added by this amendment. Further, it should be noted that such amendments have been made without conceding the correctness of the position asserted by the Examiner, and without prejudice to Applicant's right to pursue canceled or relinquished subject matter in a future patent application. Accordingly, Claims 1, 4-15 and 20-21 remain pending for consideration in the present application, and reconsideration thereof is respectfully requested.

#### **Rejection Under 35 U.S.C. § 102(b)**

Claims 1, 4, 11-14, 16-17, and 19-20 were rejected as allegedly anticipated by United States Patent Publication No. 2002/0023733 to Hall (hereinafter "Hall"). Of these, Claims 16-17 and 19 have been canceled without prejudice.

Amended Claim 1 requires that the interstitial material include Ag, Cu, Al, Si, or BNi<sub>2</sub>. The Hall reference fails to disclose a mass of packed diamond particles bonded together by any of the listed and claimed interstitial materials. The Hall reference does disclose a number of "bondable

materials” which include copper and aluminum. However, as discussed during the Examiner interview, these materials are not interstitial materials which are used to bond the diamond particles together. Rather, these “bondable materials” “accumulate, or pool, in a layer near or on the opposite surface of the heat spreader.” See paragraph 28 of Hall. Further, these “bondable materials” do not act to bond the diamond particles together. The diamond of the Hall reference is a conventional cobalt sintered diamond mass having cobalt remaining in the mass and having a “bondable material” added to form a layer on one side of the heat spreader to facilitate bonding with another component such as a heat sink or thermal source.

In context of the presently claimed invention, cobalt is an undesirable component as it has a very low thermal conductivity and reduces the overall thermal conductivity and effectiveness of the composite heat spreader. For example, the claimed interstitial elements have relatively high thermal conductivities, i.e. Ag (429 W/mK), Cu (401 W/mK), Al (237 W/mK), and Si (148 W/mK). In contrast, cobalt has a thermal conductivity of only 100 W/mK. Cobalt sintered diamond exhibits inferior thermal conductivity which is typically only marginally improved over conventional copper heat spreaders and is often below that of copper. Heat spreaders produced using the claimed interstitial materials have significantly increased thermal conductivities over that of copper-based heat spreaders. As the Hall reference fails to teach or suggest the claimed interstitial materials it also fails to anticipate the claimed invention. Therefore, Applicant respectfully submits that the Hall reference does not teach the claimed invention and requests that the rejections based thereon be withdrawn.

**Rejection Under 35 U.S.C. § 103(a)**

Claims 1, 4-6, 16-18, and 21 were rejected as allegedly obvious over U.S. Patent No. 6,039,641 (hereinafter, "Sung") in view of Nishibayashi (09-312362). Applicant respectfully submits that the rejected claims are patentable over the cited references for the reasons set forth below, and requests that the rejections be withdrawn.

Before discussing the § 103 rejections, it is thought proper to briefly state what is required to sustain such a rejection. The issue under § 103 is whether the PTO has stated a case of *prima facie* obviousness. "The PTO has the burden under § 103 to establish a *prima facie* case of obviousness."

In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). To satisfy this burden, the PTO must meet the criteria set out in M.P.E.P § 706.02(j):

. . . three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

With the above background in mind, the rejections under 35 U.S.C. § 103 will be discussed. Applicant contends that the cited references fail to make a *prima facie* case of obviousness in that: i) it has failed to show motivation to combine the cited references; and ii) that the cited references fail to teach or suggest all of the claim limitations of Applicant's invention.

Neither of the cited references teaches "packing diamond particles" such that each particle is substantially in contact with at least one other particle." Specifically, Nishibayashi teaches carefully

arranging diamond particles and embedding them in a metal matrix. As such, the products of Nishibayashi include a significant metal content rather than a diamond matrix with interstitial voids partially filled by a metal as in the claimed invention.

Further, Sung teaches abrasive tools having patterned placement of diamond particles using various templates or slots wherein a small number of particles are placed, and has nothing to do with heat spreader devices. Therefore, neither reference individually nor the combination of references teach packing diamond particles to achieve the claimed packing configuration. Further, there is no motivation to combine the Sung reference with the Nishibayashi reference. Specifically, the Sung reference teaches cutting and abrading tools and Nishibayashi teaches heat spreaders. There is nothing in either reference, or within the body of knowledge of those skilled in the art which would suggest such a remote combination of cutting tool references with electronic components such as heat spreaders. There is no common problem being solved. For example, Sung is using diamond particles in a pattern to provide aggressive and reliable cutting of a workpiece. In contrast, Nishibayashi is attempting to increase overall thermal conductivity of a heat spreader to remove heat from a heat source such as a CPU without regard to mechanical strength.

In light of the above comments, Applicant respectfully submits there is no suggestion or motivation to modify the Nishibayashi and Sung references, or to combine the teachings of the Nishibayashi and Sung references. As such, a *prima facie* case necessary to support a § 103 rejection was not established.

Finally, the references cited by the Examiner fail to teach or suggest each of the elements of the claimed invention. As discussed above, the Nishibayashi reference includes a matrix of metal in

which diamond particles are carefully arranged and bonded to one another. The Sung device includes a metal matrix having diamond particles placed in predetermined patterns to produce a superior cutting tool. Nothing in the combination of references teaches or suggests a plurality of diamond particles which are in intimate contact with one another and bonded by any of the listed interstitial materials as required by the present invention.

In light of the above comments, Applicant respectfully submits the art cited in the Office Action fails to teach or suggest each of the elements of the claimed invention. Accordingly, Applicant respectfully requests that the rejections be withdrawn and the claims be passed to issue.

**CONCLUSION**

In view of the foregoing, Applicant believes that presently pending Claims 1, 4-15 and 20-21 present allowable subject matter and allowance is respectfully requested. If any impediment to the allowance of these claims remains after consideration of the above remarks, and such impediment could be resolved during a telephone interview, the Examiner is invited to telephone Mr. Erik Ericksen, or in his absence, the undersigned attorney, at (801) 566-6633, to address such issues as expeditiously as possible.

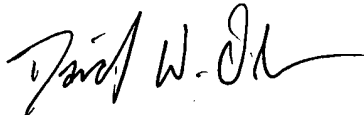
A check in the amount \$450.00 is included for a two month extension of time in which to timely reply to the Office Action.

Please charge any additional fees except for Issue Fee or credit any overpayment to Deposit Account No. 20-0100.

Dated this 30<sup>th</sup> day of September, 2005.

Respectfully submitted,

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